

# Patenting AI: How US Patent System Evolves To Keep Up With the AI Revolution

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The rise of artificial intelligence (AI) applications in recent years has been accompanied by a surge in patent filings by AI developers. But like many other emerging technologies before it, AI inventions face patent eligibility challenges. The US patent system exists to promote innovation, and therefore has to evolve to encourage the development of this exciting and potentially revolutionary new technology.

It may seem that AI applications, like a generative AI chatbot ChatGPT and an AI image generator DALL-E, recently appeared out of nowhere and astonished everyone with their highly advanced capabilities of conducting human-like conversations and generating creative images. However, the underlying technologies of these AI applications, such as artificial neural networks, deep learning models, natural language processing, has been in development for years. Thousands of patent applications have been filed for AI-related inventions in the United States and worldwide for these and other technologies. In fact, according to the 2022 AI Index Report from the Center for Security and Emerging Technology, the number of AI-related patent applications filed worldwide between 2015 and 2022 has nearly doubled each year.

However, the prosecution of AI-related patent applications has been challenging in the United States due to the strict subject matter eligibility requirements applied to software inventions under 35 USC 101 in view of the US Supreme Court decision in *Alice Corp v. CLS Bank* (the Alice decision), which defines a two-step test for determining the patentability of software inventions as follows: (1) determine whether the claims are directed to a patent-ineligible concept (e.g., an abstract idea); and (2) determine whether the claim's elements, considered both individually and as an ordered combination, transform the nature of the claims into a patent-eligible application. Because of the broad interpretation of the concept of abstract idea under the Alice test, many AI-based patent invention were deemed patent ineligible.

Recognizing the importance of the AI technology, the dramatic increase in new AI patent filings, and application examination challenges caused by the Alice decision, the US Patent and Trademark Office (USPTO) published a report to the US Congress in June 2022 addressing a concern that many AI-related inventions are “at risk of patent ineligibility under the Alice two-step framework because they may be characterized as methods of organizing human activity, mental processes, or mathematical concepts, and thus may be ineligible if they fail to recite ‘significantly more’ than those judicial

exceptions.” The June 2022 report describes a study conducted by the USPTO in which it discovered that there was “a substantial decrease in allowance rate for patent applications containing AI following the Alice decision in June 2014.”

To reduce the Section 101 rejections of the AI and other software inventions, the USPTO took preemptive actions by publishing the **2019 Revised Patent Subject Matter Eligibility Guidance** that clarifies the concept of the abstract idea, based on the body of Federal Circuit decision interpreting the Alice test and educates the USPTO examiners how to properly evaluate the patent eligibility of AI-based and other software invention. In particular, the new guidance clarifies that an abstract idea falls within one the following three groups: mathematical concepts – mathematical relationships, mathematical formulas or equations, mathematical calculations; certain methods of organizing human activity – fundamental economic principles or practices (including hedging, insurance, mitigating risk); or mental processes – concepts performed in the human mind (including an observation, evaluation, judgment, or opinion).

Furthermore, the Revised Guidance provides several examples of AI inventions along with proper subject matter eligibility analyses. For instance, Example 39 describes a claim for a method for training a neural network for facial detection having the following steps: “collecting a set of digital facial images ...; applying one or more transformations ...; creating a first training set ...; training the neural network in a first stage using the first training set ...; creating a second training set for a second stage ...; and training the neural network in a second stage using the second training set.” The accompanying subject matter eligibility analysis states that this claim is patent eligible because “the claim does not recite any mathematical relationships, formulas, or calculations.... [any] mental process... [nor] any method for organizing human activity.” Following the publication of the Revised Guidance, the USPTO allowance rate of patent applications containing AI increased by about 8%.

The Patent Trial and Appeal Board (PTAB) has also provided decisions that tackle 101 challenges. For example, in Appeal 2018-003323 of US App. No. 14/735,002, which describes systems and methods for improving the transcription of speech into text using AI, PTAB reversed a 101 rejection alleging that the claims are directed to a mathematical concept and a mental process (e.g., a human listening to an audio file and transcribing the audio data into text). PTAB stated “even if the claims were considered to recite a mathematical concept, under prong two [of the Alice test] the claims are not directed to an abstract idea because the alleged judicial exception is integrated into a practical application....[T]he claims of the current application include specific features that were specifically designed to achieve an improved technological result... and provide improvements to that technical field.”

While the US patent system gradually evolves to assure adequate protection of the AI inventions, it is a task of patent attorneys to keep abreast of the USPTO examination trends, and important PTAB, Federal Circuit, and Supreme Court decisions related to the patentability of AI inventions in order to effectively draft and prosecute AI patent applications in anticipation of possible 101 rejections.

ArentFox Schiff’s attorneys consistently meet and anticipate these challenges by emphasizing technical improvements in the AI applications, incorporating technical steps, and ensuring that a specification fleshes out a problem-solution combination that can be tied to a practical application. In fact, our attorneys have helped many industry leaders acquire patents for AI invention in various technical fields, such as cybersecurity for detecting malicious behavior in process chains using AI (US Pat. 11,609,988), user interface optimization involving customizing, using AI, a user workspace environment based on user access habits (US Pat. 11,593,130), AI improvement involving compressing neural networks using block partitioning (US Pat. 11,496,151), medical technology involving application of Bayesian networks to patient screening and treatment (US Pat. 11,562,323), and predictive marketing involving training a machine learning model to identify behavioral patterns of high-value website visitors and predicting the purchase value for new visitors in near real-time (US Pat. 11,562,298), to name a few.

**ArentFox Schiff** is a market leader in helping clients to navigate the business and legal issues surrounding AI technology. Top technology and software companies turn to ArentFox Schiff for our experience in intellectual property law to assist them with protection of their innovative AI solutions using patents, trademarks, and copyrights in the United States and worldwide.



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